

ABSTRACT OF DISCLOSURE

[00056] A field emission electron source includes a substrate, a first conductive electrode terminated to provide electrons, an emitting composite layer for emitting electrons, and a second electrode insulated from the emitter layer and terminated to extract electrons through vacuum space. The emitting composite layer lies between and parallel to the said first and the second electrodes, and comprises nano-structures embedded in a solid matrix. One end of the nano-structures is truncated and exposed at the surface of the emitter layer so that both the length and the apex of the nano-structure are regulated and the exposed nano-tips are kept substantially the same distance from the gate electrode. The embedding material is chosen to form triple junctions with the exposed tip to further enhance the field.